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On a Conjecture of C. L. Wang

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In his paper Wang [1] posed the following conjecture:

Let F be an increasing function having a nonnegative third derivative on $(0, 2b)$, $b>0$. Then for $x_j \in (0, b]$ and $p_j > 0, j = 1, ..., n$ with $P_n = \sum p_j$ we have

$$\frac{\sum p_j F(x_j)}{P_n} \leqslant F\left(\frac{\sum p_j x_j}{P_n}\right) + F\left(F^{-1}\left(\frac{\sum p_j F(x_j)}{P_n}\right) + F^{-1}\left(\frac{\sum p_j F(2b - x_j)}{P_n}\right)\right) \tag{*}$$

He gave $F(u) = \log u$ and $b = \frac{1}{2}$ as an example of his conjecture. Here we observe that (*) is no longer true if we choose $b = \frac{1}{4}$ and still $F(u) = \log u$. For instance, we can choose $x_j = \frac{1}{4}$, $p_j = 1$, $j = 1, ..., n$ to reach a contradiction.

Finally, we observe that if F is increasing, then (*) holds for any $b > 0$ if and only if $F \geqslant 0$. The proof is straightforward and hence omitted.

REFERENCE

1. C. L. WANG, On a Ky Fan inequality of the complementary *A-G* type and its variants, *J. Math. Anal. Appl.* **73** (1980), 501–505.

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